



## DEVICE FOR DETECTING THE ROTATING SPEED OF A FAN MOTOR

### BACKGROUND OF THE INVENTION

This invention relates to a device for detecting the  
5 rotating speed of a fan motor, particularly to one including a  
motor and a gear case secured in front of the motor and  
having plural gears engaged with one another inside, with one  
of them embedded with a permanent magnet, and also having  
a magnetic inductive element to cooperate with the permanent  
10 magnet for operating together to detect the rotating speed of  
the motor.

One conventional device for detecting the rotating  
speed of a motor shown in Fig. 1 has an encoder functioning  
as a light-controlling element at the rear side of a motor (A) to  
15 detect the rotating speed of the shaft of the motor (A). Another  
conventional device shown in Fig. 2 has a rotating disc B1  
under the center shaft B0 of a motor (B) and a permanent  
magnet B10 fitted around the rotating disc B1. Thus, the  
magnet B10 cooperates with a magnetic inductive element B2  
20 to operate together to detect the rotating speed of the motor.

Although two conventional devices mentioned above  
are available for detecting the rotating speed of a motor, yet  
the aforesaid encoder or a magnetic inductive element has to  
be installed at the rear side of the motor, thus not only  
25 complicating the structure of a motor, but increasing

manufacturing cost as well. Besides, the aforesaid encoder is not suitable for provided in a gear case, which is filled with machine oil, otherwise operation cannot be carried on normally.

5           SUMMARY OF THE INVENTION

The objective of this invention is to offer a device for detecting the rotating speed of a fan motor, possible to facilitate its installing and to take less space.

The features of the invention are described below.

10           1. A permanent magnet respectively having a N pole and a S pole is embedded in any one of plural gears in the gear case connected with a motor and the permanent magnets together with a magnetic inductive element (such as HALL IC) positioned above it are activated to operate together by  
15 rotating of the gear to detect the rotating speed of the motor.

2. The magnetic inductive element (HALL IC is the best) of this invention is not affected by the machine oil in the gear case, always keeping a good operating condition.

BRIEF DESCRIPTION OF DRAWINGS

20           The invention will be better understood by referring to the accompanying drawings, wherein:

Fig. 1 is a cross-sectional view of a conventional device for detecting the rotating speed of a fan motor;

25           Fig. 2 is a cross-sectional view of another conventional device for detecting the rotating speed of a fan motor;

Fig. 3 is a top view of a first embodiment of a device for detecting the rotating speed of a fan motor in the present invention;

Fig. 4 is a cross-sectional view of the line 4-4 in Fig. 3;

5 Fig. 5 is a top view of a second embodiment of a device for detecting the rotating speed of a fan motor, with the magnetic inductive element in operating condition in the present invention; and,

Fig. 6 is a cross-sectional view and a partially  
10 magnified view of a third embodiment of a device for detecting the rotating speed of a fan motor in the present invention.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

A preferred embodiment of a device for detecting the rotating speed of a fan motor in this invention, as shown in  
15 Figs. 3 and 4, includes a motor 1, a gear case 2 combined together.

The motor 1 has a shaft 10 fixed with a gear 11 engaging with a gear 20 in the gear case 2. The gear case 2 has a case body 23 an interior space 220 for containing plural  
20 gears 20, 21 and 22 fitted inside, with the gear 20 and the gear 21 engaging with each other and then the gear 22 connected to a rotating shaft 3 of an electric fan. Further, two permanent magnets 200 respectively provided with an N pole and an S pole are embedded in the gear 20.

25 Besides, a magnetic inductive element 4 is fixed on a

fundamental plate 40 and the fundamental plate 40 together with a base 41 is stably bolted in the case body 23. Thus, the magnetic inductive element 4 can stay above, not on, the gear 20, as shown in Fig. 4, so as to maintain a fixed distance

5 between the magnetic inductive element 4 and the two permanent magnets 200, thus bringing forth the best effect of operation. Further, a HALL I C is the best to serve as the magnetic inductive element 4, which will be reacted to operate by the magnetic field of the N Pole and the S Pole of the  
10 permanent magnets 200, so that the rotating speed of the gear 20 can be detected and then the rotating speed of the motor can also be calculated according to the gear proportion between the gear 20 and the gear 11.

A second preferred embodiment of a device for detecting  
15 the rotating speed of the motor in the present invention shown in Fig. 5, has a permanent magnet 210 having an N Pole and an S Pole embedded in the gear 21 and the magnetic inductive element 4 lies above, not on, the gear 21. Thus, the magnetic inductive element 4 will be in cooperation with the  
20 permanent magnet 210 for operating to produce the same effect as that of the first embodiment.

A third preferred embodiment of a device for detecting the rotating speed of a fan motor in the present invention shown in Fig. 6, has a permanent magnet 100 fixed around  
25 the shaft 10 of the motor to interact with a magnetic inductive

element 4, having the same effect as those of the first and the second embodiments.

As can be understood from the above description, the gear proportion among the gears 20, 21 and 22 engaging with  
5 each other in the gear case 2 can be preset depending on practical needs, and the permanent magnet can be embedded either in gear 20 or 21 or 22 so long as it is convenient to be installed.

While the preferred embodiments of the invention have  
10 been described above, it will be recognized and understood that various modifications may be made therein and the appended claims are intended to cover all such modifications that may fall within the spirit and scope of the invention.